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(12) # EUROPEAN PATENT SPECIFICATION

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(54) **Controlling seal systems in rotary regenerative air preheaters.**

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(56) References cited:
GB-A- 1 391 261
GB-A- 2 091 003
US-A- 3 232 335
US-A- 3 999 597
US-A- 4 301 858
US-A- 4 306 612

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hoods, to lift the sealing frames or allow them to lower. Such magnetic drive devices are disclosed in our GB-A 1 559 679 as well as in GB-A 2 091 003.

The signal Xi to the magnetic drive device 5 causes it to move in an appropriate direction to adjust the gap between the seal frame 13 and the sensor assemblies S1–S8. This signal is maintained until a signal from a succeeding sensor out of the sensor assemblies S1–S8 indicates, as the hood passes it, that the gap is now wrongly set when that signal will alter the signal Xi and cause an adjustment in the positioning of the sealing frame.

It can be seen that all the sensing and comparatively low amplitude signal circuitry is stationary; the control box may be and preferably is quite remote from the regenerator so that its electronic elements are not subject to the hostile environment in which the regenerator works. However, drive signals passing from that box to the magnetic drive devices being of comparatively high amplitude or power can readily pass through conventional slip ring constructions to the drive devices borne on the rotating part. Furthermore, the sensor assemblies S1–S8 are arranged in a bridge circuit so that they are unaffected by temperature variations.

Figures 4 and 5 show a rotating matrix machine with stationary ducts and sector plates. The rotating matrix 20 extends into ducts 21, 22 for air and gas respectively. There are sealing strips 25 on the matrix. Sector plates 23, 24 are located between the ducts 21, 22, one on each side of the matrix 20, each sector plate 21, 22 having two wings carrying sensors assemblies S11 to S14 and magnetic drive devices D11 to D14. The sensors used are preferably those disclosed in our EP-A 133 793. As can be seen from Figure 5, the sensor and drive arrangement on the sector plate 23 above the matrix 20 is the same as that on the sector plate 24 below the matrix 20.

As shown in Figure 4 the drive devices D11 to D14 are arranged on a diametrical line. The number of drive devices is dependent on the size of the air pre-heater. Each drive device D11–D14 has a corresponding "live" sensor in the assemblies S11–S14 which controls its operation, the sensor being placed in a position in advance of the corresponding drive device. For large air preheaters it may be necessary to provide sets of two or more drive devices, each set having drive devices spaced circumferentially on the sector plate. Each set would then have a single "live" sensor.

In the embodiment of Figures 4 and 5 the output of the sensor assemblies S11–S14 is passed to a control cabinet (not shown) as in the embodiment of Figures 1 to 3. There is a similar strategy of control from one sensor governing the position set by the sector plate in relation to the sealing strips 25 until it becomes apparent from the signal received from the subsequent sensor that correction is needed, in which case corrective drive is applied.

It is often found that the air preheaters flex relative to the hub so each wing of the sector plates 23 and 24 have a corresponding arrangement of sensors and driv devices.

A "dummy" sensor is provided adjacent each "live" sensor in the assemblies S11–S14 for temperature compensations, which is particularly important at the hot end of the rotating matrix air preheater.

Aspects of the present disclosure relating to a stationary matrix machine are claimed in EP-A 137 670, from which the present application was divided.

Claims

1. A rotary regenerative air preheater having means for sealing between relatively rotatable parts (11, 14; 20, 23) of the preheater, and a plurality of electromagnetic drive means (5, D11–D14) for driving the sealing means (13; 23, 25) in a predetermined axial relationship, and control means comprising a plurality of electrical sensor assemblies (S1–8, S11–14) placed sequentially in the path of relative rotation of the sealing means, and a control circuit, live sensors (15) of the sensor assemblies being linked through the circuit to at least one associated said drive means (5, D11–14), the circuit including means for comparing the sensed axial relationship at each sensor assembly with a predetermined axial relationship and driving the associated drive means to bring the sealing means to the predetermined axial relationship, whereby the sealing means is sequentially checked and adjusted as necessary on a plurality of occasions during each relative rotation, characterized in that at least some of said sensor assemblies include comparison sensors (16) representing a preset gap.

2. A rotary regenerative air preheater according to claim 1 wherein the circuit means comprise bridges two legs of which are a said sensor (15) and comparison sensor (16).

3. A rotary regenerative air preheater according to claim 1 or claim 2 wherein the predetermined axial relationship is a gap of between 1 and 2 mm.

4. A rotary regenerative air preheater according to any one of the preceding claims wherein the control means includes a control box (18) which is mounted stationary and remote from the preheater.

5. A rotary regenerative air preheater according to any one of the preceding claims wherein the preheater is of the rotating matrix type, the rotating seal means being strips (25) on the end faces of the matrix (20) and the sensors (S11–13) and drive means (D11–14) being borne on sector plates (23) of a stationary body of the preheater.

6. A rotary regenerative air preheater according to any one of claims 1–4 wherein the preheater is of the stationary matrix type, the rotating seal means being frames (13) on rotating hoods (14), the sensors (S1–8) being stationary and the drive means (5) being borne on the hoods, electrical power supply means to the drive means including slip rings (4) about the axis of rotation of the hoods.

Patentansprüche

1. Umlaufender Regenerativluftvorwärmer mit einer Dichtungseinrichtung zwischen zueinander verdrehbaren Teilen (11, 14; 20, 23) des Vorwärmers und mehreren elektromagnetischen Antriebseinrichtungen (5, D11–D14) zum Antreiben der Dich-

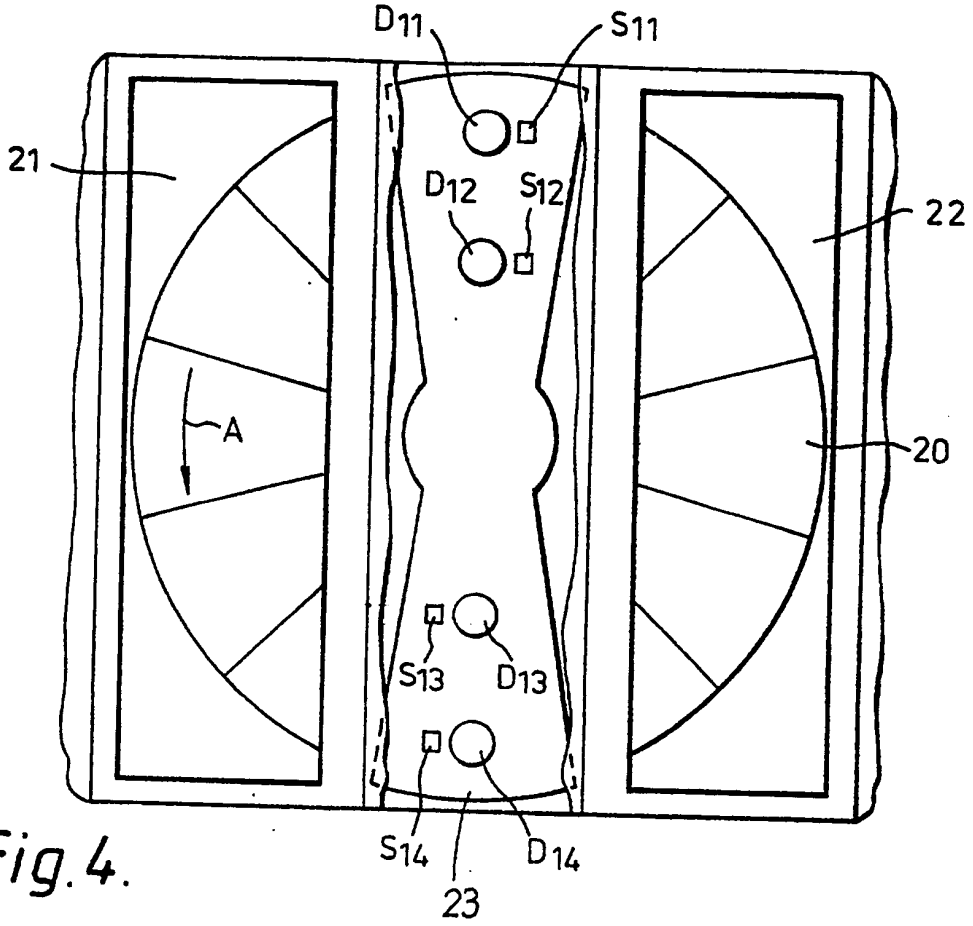
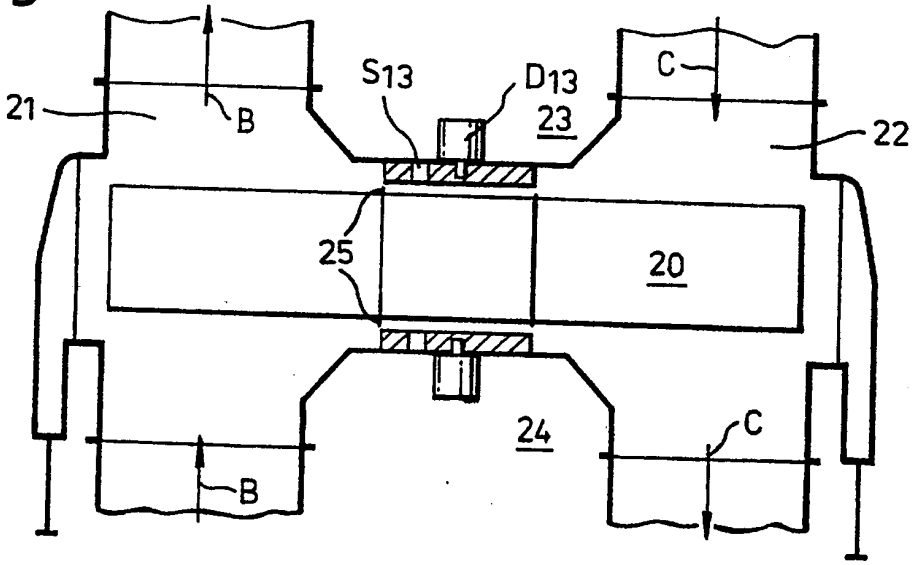

D11
S11
21
D12
S12
22
A
20
S13
D13
S14
D14
23

Fig. 4.

Fig. 5.


21
B
S13
D13
23
C
22
25
20
24
C
B